Potential USGS Contributions to a Coordinated Federal Response

Reduce Nutrient Loading

- Evaluate pollutant transport and accumulation and resulting impacts on seagrasses, algae, and microbes
- Isolate the fractional contributions of nutrients from existing agricultural and wastewater discharges and their relative contributions to Gulf hypoxia - and compare with historic sediment core data
- Examine sources, sinks, and nutrient cycling processes that determine dissolved inorganic nitrogen composition in streams and rivers
- Identify rates and process controlling denitrification and nutrient concentrations in the Mississippi
- Examine denitrification potential of various riverine habitats (open channel, sloughs, wetlands, etc.)
- Develop methods for reducing nutrient loads and controlling the effects of excess nutrients by developing system models and decision support tools
- Conduct biogeochemical investigations on natural vs anthropogenic hypoxia in the northern Gulf
- Retrospective of impacts of nutrients on fish and invertebrate communities

Improve Water Quality

- Use molecular-based techniques to identify and track microbial water quality indicators in Florida estuarine sediments and beach sands
- Link the onshore with the offshore in terms of ground water discharge and pollutant transport
- "Bacteria and Sand" – sand monitoring for Clean Beaches
- Investigate microbial interactions on the mobilization, transition, and fate of metals and other contaminants in oxic and anoxic sediments
- Compilation and modeling of a national fish tissue mercury dataset
- Quantify terrigenous fluxes into coastal margins
- Gulf Environmental History: Foraminifera, hypoxia, monsoon, stable isotopes in Mississippi, Louisiana, Texas
- NASQAN – Water Quality Network

- NAWQA – expand water quality assessment along the entire Gulf Coast (example: Acadian-Ponchartrain study identifies agricultural pesticides, nutrients, trace metals and volatile organic compounds)

Restore Wetlands

- Quantify and model the effects of various management and restoration activities on wetland functions, including improvement in water quality, carbon sequestration, and biodiversity.
- Evaluate of best management practices for sustaining biological communities and habitat integrity using risk assessment
- Restoration techniques for damaged or degraded ecosystems: Development of decision support and functional assessment models for the Gulf coast environment
- Wetland restoration ecology: Enhancing the establishment and persistence of plant communities
- Sudden marsh die-back in Coastal Louisiana: Vegetation and soil status, mechanisms of dieback, and potential for recovery
- Restoration of seagrass meadows in the Laguna Madre of Texas
- Beach and barrier island studies in Louisiana (for wetland protection): addresses sediment resources, restoration design, project performance and ecosystem sustainability

Identify Gulf Habitats

- Evaluate use of benthic communities by fish populations on ridge and shoal features off Louisiana
- Spatial analysis and landcover inventories: Biological characterization of the Lower Mississippi Valley and Gulf coast landscapes
- Geologic framework, sediment characterization, wetland change, and geologic database (Appalachicola, West Coast of Florida).
- Geology of shelf-edge habitats of the northern Gulf of Mexico including sediment (substrate) mobility and transport
- Assess impact of anthropogenic habitat disturbance and identify the processes and time periods required for recovery
- Dynamics of land margin ecosystems: Historical change, hydrology, vegetation, sediment and climate

- Remote sensing as an integrated approach to monitoring vulnerabilities and predicting changes in wetlands
- Advanced electronic technologies applied to natural resources management and research
- Photo acquisition, mapping and surveying techniques, and methods assessment

Environmental Education

- "Wetland education Through Maps And Aerial Photography" (WETMAAP training/workshops for teachers/stakeholders)
- "Strategies for Ecology, Education, Development and Sustainability" (SEEDS training/workshops for teachers/stakeholders)
- "The Fragile Fringe – A Guide for Teaching about Coastal Wetlands"
- National Wetlands Research Center "GIS-Day" (every November)
- Gulf of Mexico Data and Information Management System (Gulf DIMS)
- National Knowledge Bank for Coastal and Marine Geology
- "Gulf of Mexico – Status of Knowledge"